COASTAL AND MARINE BIOLOGY AND ECOLOGY (LM51)

(Lecce - Università degli Studi)

Teaching BIODIVERSITY AND ECOSYSTEM FUNCTIONING

GenCod A006029

Owner professor SERGIO ROSSI

Teaching in italian BIODIVERSITY AND ECOSYSTEM FUNCTIONING

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SSD code BIO/05

Reference course COASTAL AND MARINE BIOLOGY AND ECOLOGY

Course type Laurea Magistrale

Credits 6.0

Teaching hours Front activity hours: 48.0

For enrolled in 2022/2023

Taught in 2022/2023

Course year 1

Language ENGLISH

Curriculum Curriculum E-Biodiversity and Ecosystem Sciences

Location Lecce

Semester First Semester

Exam type Oral

Assessment Final grade

Course timetable https://easyroom.unisalento.it/Orario

BRIEF COURSE DESCRIPTION

Biodiversity and ecosystem functioning are tightly related. In this course, we will study how important are the concepts of biodiversity, demography and population dynamics, trophic ecology and life cycles, environmental factors and biochemical cycles in understanding pelagic and benthic system functioning. Once these concepts and the related methods to quantify such parameters are explained, we will make a wide spectra of systems (e.g. coral reefs, Mediterranean sea, polar areas, deep sea communities, etc.), stressors and impacts to understand how the functioning of the pelagic and benthic systems in the oceans are changing. Direct impacts such as fisheries, pollution or coast transformation will be analyzed. The synergistic path with indirect stressors such as rising temperatures, ocean acidification or sea level rise will be also studied to understand how deep is the change on the functioning of these ocean systems. Finally, we will give tools for management and conservation: new aquaculture methods, new fishery approaches, marine restoration and marine protected areas design and management guides to improve ecosystem functioning enhancing biodiversity and complexity.

REQUIREMENTS

Fundamentals of general biology, zoology, botany and ecology are prerequisites to achieve high proficiency of this course

COURSE AIMS

The student has to achieve the biodiversity and ecosystem function concepts but, more important, she/he has to be capable to apply quantitative tools to asses such functionality. She/he has to have at hand conservation and management measures/tools to confront real conservation/regulation measures.

TEACHING METHODOLOGY

The six credits are based on theoretical and practical concepts, with an open debate during the classroom.

ASSESSMENT TYPE	The achievement of the credits attributed to teaching is obtained through an oral exam: four questions of the different developed concepts. Four perfect answers will give 28/30 punctuation. To reach the maximum score, before starting the oral exam, the student has to make a brief presentation based on a paper, book chapter or review related with the marine biodiversity and ecosystem functioning subject. The choice of the text to make the presentation is free.
FULL SYLLABUS	Introduction, the value of science. How we are transforming the oceans. Biodiversity, what are we talking about? Biodiversity: different habitats, different organisms, different methods. Posidonia oceanica and biodiversity. Antarctica: pristine environment for Biodiversity case studies. Biodiversity & impacts: examples with the intertidal. Approaching biodiversity with genetics: metabarcoding. Biodiversity: frontier systems. Demography and population dynamics. Demography: precious corals. ROV and other tools for benthic cartography and demography. Demography: some examples OF applied models. Self thinning role: understanding sessile long lived species population structure. Biogeochemical cycles in the ocean. Benthic-pelagic coupling and near bottom seston. Segrasses: an example for biogeochemical cycles. Biogeochemical cycles: carbon sinks. Trophic ecology of suspension feeders and heterotrophic energy inputs. Photobiology: mixotrophic cnidarians and the limits of photoadaptation. The cost of suspension feeding: energy output in suspension feeders. Trophic biomarkers (I): Stable isotopes. Trophic biomarkers (II): Macromolecules. Trophic ecology: combining methods. Trophic interactions and tipping points. Competition for space in benthic organisms. Alien species. Pelagic fisheries: the end of innocence. Bottom trawling: what happened with the cod? Artisanal and leisure fisheries. Medusa swarms: causes, frequency and consequences. Aquaculture: the blue revolution. Red tides, algal blooms & dead Zones. Solid marine pollution. Climate change in the oceans. Climate change and the poles. Changes of energy fluxes in marine animal forests of the Anthropocene: factors shaping the future seascape. Climate change and temperature: The Mediterranean Sea in a future world. Coral reefs, bleaching and El Niño. Ocean acidification. Marine Protected Areas monitoring and management-1. Marine Protected Areas monitoring and management-2. Integrated MultiTrophic Aquaculture (IMTA). Marine restoration. Citizen science and scientific outreach.
REFERENCE TEXT BOOKS	All the material will be provided by the teacher in form of selected books, reviews and scientific papers